

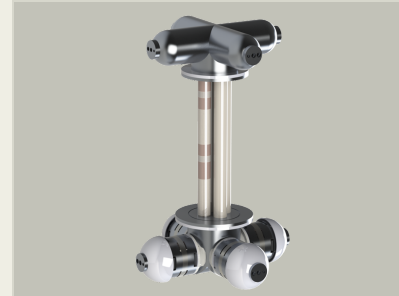
Linear Acoustic Nuclear Conversion Engine (LANCE), Phase I

Completed Technology Project (2017 - 2017)



Project Introduction

Nirvana Energy Systems (NES) has pioneered and is commercializing an innovative ThermoAcoustic Power Stick (TAPS), partially based on technology developed by Xerox PARC (Palo Alto Research Center) and NASA. NES has demonstrated and is building a 1 kW TAPS for use in remote power applications where reliability for 15+ years is of paramount importance. Moreover, NES is developing the Thermoacoustic Radioisotope Generator (TRG), a 300 W Radioisotope Power System (RPS), under the Small Business Innovative Research (SBIR) program for NASA based on TAPS technology. The novel TAPS technology has no hot moving parts and incorporates well proven, reliable linear motors and alternators in an engine based on the Stirling cycle. NES has designed, optimized, built and tested all sub-systems for reliability, ease of manufacturing and cost reduction over currently available Stirling engines. The TRG is a 300 W tunable power thermoacoustic device which is insensitive to radioisotope heat degradation, capable of 20+ years continuous operation, is inexpensive to manufacture using well established methods, and yields greater than 25% thermal to electrical efficiency all while being designed for a convertor specific power greater than 30 W/kg and anticipated system specific power near 10 W/kg. The TRG will serve as the foundation for the Linear Acoustic Nuclear Conversion Engine (LANCE), which will satisfy all of the Z1.03 solicitation requirements, as a robust and redundant 10 kW tunable power supply, representing the ultimate in remote power devices and the next step in reliable dynamic power conversion for space.

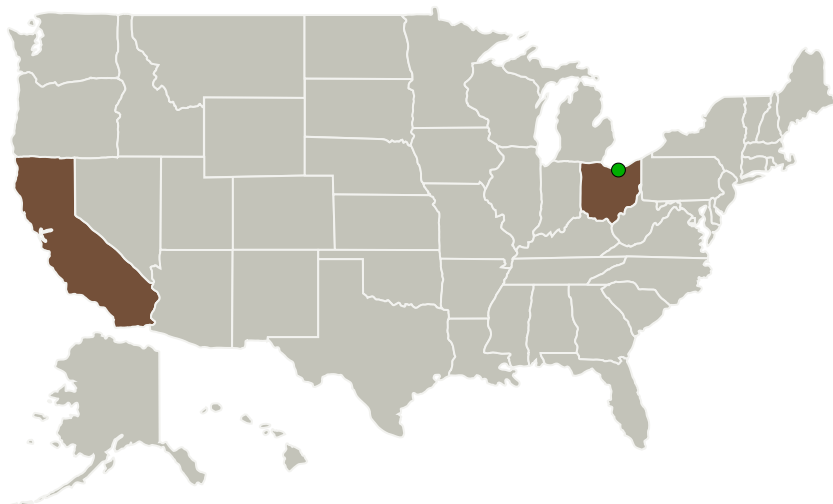


Linear Acoustic Nuclear Conversion Engine (LANCE), Phase I Briefing Chart Image

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3

Primary U.S. Work Locations and Key Partners



Linear Acoustic Nuclear Conversion Engine (LANCE), Phase I



Completed Technology Project (2017 - 2017)

Organizations Performing Work	Role	Type	Location
Nirvana Energy Systems, Inc.	Lead Organization	Industry	Portola Valley, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

California	Ohio
------------	------

Images



Briefing Chart Image

Linear Acoustic Nuclear Conversion Engine (LANCE), Phase I Briefing Chart Image
(<https://techport.nasa.gov/image/127988>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nirvana Energy Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

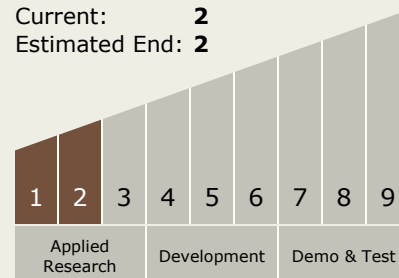
Carlos Torrez

Principal Investigator:

Geoffrey Bruder

Technology Maturity (TRL)

Start: 1
Current: 2
Estimated End: 2



Linear Acoustic Nuclear Conversion Engine (LANCE), Phase I

Completed Technology Project (2017 - 2017)



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.4 Dynamic Energy Conversion